

What is claimed is:

1. A method for searching an area for targets by a vehicle in conjunction with a plurality of other vehicles comprising the steps of:

dispersing by turning said vehicle in a random direction to establish a current heading and moving said vehicle a random distance at a current speed;

detecting targets using sensors on said vehicle during said vehicle dispersing step to establish a number of detected targets;

aggregating by turning said vehicle in another random direction to establish another heading and moving said vehicle a random distance at a current speed;

detecting targets using sensors on said vehicle during said aggregating step;

detecting other vehicles using sensors on said vehicle during said aggregating step;

responding in a predesignated way to the detection of said  
other vehicle and continuing said movement during said  
aggregating step if one of said plurality of other  
vehicles is not detected; and

repeating said dispersing and aggregating steps.

4.  
2. The method of claim 1 wherein the step of responding  
comprises:

transmitting said current heading to said detected other  
vehicle; and

receiving an other vehicle current heading from said  
detected other vehicle.

11  
3. The method of claim 4 further comprising the step of:

providing said vehicle and said plurality of vehicles with  
a preferred direction prior to initial dispersal;

said step of responding further comprising:

comparing said current heading with said preferred  
direction; and

altering said current heading to match said received other  
vehicle current heading if said received other vehicle  
current heading is closer to said preferred direction.

<sup>12</sup>  
11. The method of claim <sup>11</sup> ~~8~~ wherein said steps of dispersing and  
aggregating further comprise:

measuring an elapsed time; and

calculating a new velocity from said current velocity, said  
number of detected targets and said elapsed time.

<sup>13</sup>  
12. The method of claim <sup>12</sup> ~~11~~ further comprising the steps of:

providing said vehicle and said plurality of vehicles with  
an estimate of the target density in the search area,  
an estimate weight and an experience weight;

said step of calculating a new velocity comprising:

calculating a value for experience based on the experience weight and the elapsed time; and

calculating a new velocity from said experience value, the target density estimate and the estimate weight.

<sup>5</sup>  
~~8~~. The method of claim <sup>4</sup>~~2~~ further comprising the step of:

providing said vehicle and said plurality of vehicles with preprogrammed conditions prior to initial dispersing, said preferred direction being multiple preferred directions; and

associating each said condition with one said preferred direction;

said step of responding further comprising:

establishing a current condition from said preprogrammed conditions;

comparing said current heading with said preferred

direction associated with said current condition; and

comparing said received other vehicle current heading with

said preferred direction associated with said current condition; and

altering said current heading to match said received other vehicle current heading if said received other vehicle current heading is closer to said preferred direction associated with said current condition.

<sup>6</sup>  
~~7~~. The method of claim <sup>5</sup>~~6~~ wherein said steps of dispersing and aggregating further comprise:

measuring an elapsed time; and

calculating a new velocity from said current velocity, said number of detected targets and said elapsed time.

7.  
8.

The method of claim <sup>6</sup>~~7~~ further comprising the steps of:

providing said vehicle and said plurality of vehicles with  
an estimate of the target density in the search area,  
an estimate weight and an experience weight;

said step of calculating a new velocity comprising:

calculating a value for experience based on the experience  
weight and the elapsed time; and

calculating a new velocity from said experience value, the  
target density estimate and the estimate weight.

8.  
9.

The method of claim <sup>4</sup>~~2~~ further comprising the steps of:

transmitting said current number of detected targets to  
said detected other vehicle;

receiving an other vehicle number of detected targets form  
said detected other vehicle;

said step of responding further comprising:

comparing said current number of detected targets to said  
received other vehicle number of detected targets; and  
altering said current heading to match said received other  
vehicle current heading if said received other vehicle  
number of detected targets is greater than said  
current number of detected targets.

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~~10~~. The method of claim ~~9~~<sup>8</sup> wherein said step of dispersing  
further comprises:

measuring an elapsed time; and

calculating a new velocity from said current velocity, said  
number of detected targets and said elapsed time.

10  
~~11~~. The method of claim ~~10~~<sup>9</sup> further comprising the steps of:

providing said vehicle and said plurality of vehicles with  
an estimate of the target density in the search area,  
an estimate weight and an experience weight;

said step of calculating a new velocity comprising:

calculating a value for experience based on the experience weight and the elapsed time; and

calculating a new velocity from said experience value, the target density estimate and the estimate weight.

<sup>14</sup>  
~~12~~. The method of claim <sup>4</sup>~~2~~ further comprising the steps of:

providing said vehicle and said plurality of vehicles with a preferred direction prior to initial dispersal;

transmitting said current number of detected targets to said detected other vehicle;

receiving an other vehicle number of detected targets from said detected other vehicle;

said step of responding further comprising:

comparing said current number of detected targets to said received other vehicle number of detected targets;



altering said current heading to match said received other vehicle current heading if said received other vehicle number of detected targets is greater than said current number of detected targets; and

altering said current heading to match said received other vehicle current heading if said received other vehicle current heading is closer to said preferred direction and if said received other vehicle number of detected targets is the same as said current number of detected targets.

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13. The method of claim ~~12~~<sup>14</sup> wherein said step of dispersing further comprises:

measuring an elapsed time; and

calculating a new velocity from said current velocity, said number of detected targets and said elapsed time.

<sup>14</sup>  
~~14~~. The method of claim <sup>15</sup>~~13~~ further comprising the steps of:

providing said vehicle and said plurality of vehicles with  
an estimate of the target density in the search area,  
an estimate weight and an experience weight;

said step of calculating a new velocity comprising:

calculating a value for experience based on the experience  
weight and the elapsed time; and

calculating a new velocity from said experience value, the  
target density estimate and the estimate weight.

<sup>17</sup>  
~~15~~. The method of claim <sup>4</sup>~~2~~ further comprising the steps of:

providing said vehicle and said plurality of vehicles with  
a preferred direction prior to initial dispersal;

transmitting said current number of detected targets to  
said detected other vehicle;

receiving an other vehicle number of detected targets from  
said detected other vehicle;

said step of responding further comprising:

comparing said current number of detected targets to said  
received other vehicle number of detected targets;

altering said current heading to match said received other  
vehicle current heading if said received other vehicle  
number of detected targets is greater than said  
current number of detected targets; and

altering said current heading to match the preferred  
direction if said received other vehicle number of  
detected targets is less than said current number of  
detected targets.

<sup>18</sup>  
~~16~~. The method of claim <sup>17</sup>~~15~~ wherein said step of dispersing  
further comprises:

measuring an elapsed time; and

calculating a new velocity from said current velocity, said number of detected targets and said elapsed time.

<sup>19</sup>  
~~17~~. The method of claim <sup>18</sup>~~16~~ further comprising the steps of:

providing said vehicle and said plurality of vehicles with  
an estimate of the target density in the search area,  
an estimate weight and an experience weight;

said step of calculating a new velocity comprising:

calculating a value for experience based on the experience weight and the elapsed time; and

calculating a new velocity from said experience value, the target density estimate and the estimate weight.

<sup>21</sup>  
~~18~~. The method of claim 1 wherein said step of dispersing further comprises:

measuring an elapsed time; and

calculating a new velocity from said current velocity, said number of detected targets and said elapsed time.

<sup>3</sup>/<sub>19</sub>. The method of claim <sup>2</sup>/<sub>18</sub> further comprising the steps of:

providing said vehicle and said plurality of vehicles with an estimate of the target density in the search area, an estimate weight and an experience weight;

said step of calculating a new velocity comprising:

calculating a value for experience based on the experience weight and the elapsed time; and

calculating a new velocity from said experience value, the target density estimate and the estimate weight.